

REMARKS

Claims 16-32 are pending in this application.

Claim 30 is amended to correct a typographical error made in Applicants' December 18, 2002 Amendment. Claim 30 now correctly corresponds with the specification at page 11, page 10,

The Office Action rejects claims 16, 18 and 31-32 under 35 U.S.C. § 103(a) as being obvious over Zhang et al. (U.S. Patent No. 5,578,520) in view of Schachameyer et al. (U.S. Patent No. 4,685,976). The Office Action also rejects claims 17 and 19-30 under 35 U.S.C. § 103(a) as being obvious over Zhang et al. in view of Schachameyer et al. and further in view of one or more of Fan et al. (U.S. Patent No. 4,309,225), Asakawa et al. (U.S. Patent No. 5,795,385), Selvakumar et al. (U.S. Patent No. 5,633,194), Ichikawa et al. (U.S. Patent No. 5,484,746) and Krimmel (U.S. Patent No. 4,140,546). These rejections are traversed.

The presently claimed invention is directed to a crystalline silicon film forming method including preparing a film forming apparatus having a silicon film forming vacuum chamber for forming a crystalline silicon film on a substrate, and provided with a film forming device for forming a pre-film of the crystalline silicon film on the target surface of the substrate, and an energy beam radiating device for irradiating said pre-film with an energy beam for crystallizing the pre-film. In the presently claimed invention, both the forming of the pre-film of the crystalline silicon film on the target surface as well as the irradiation of the pre-film is conducted in the vacuum chamber.

Thus, in the presently claimed method, a crystalline silicon pre-film is formed on a target surface in a vacuum chamber and subsequently the pre-film is irradiated with an energy beam for crystallization on the pre-film.

Schachameyer et al. has been cited to show a single chamber semiconductor processing chamber. The Office Action asserts that Schachameyer et al. teaches that radiation is introduced into the chamber to react with a gas to expitaxially deposit a first layer.

Applicants respectfully note that in Schachameyer et al., "excimer laser radiation is introduced into the chamber at a first discrete wavelength to photolytically react with a [gas] ... at a discrete excitation energy photochemically breaking bonds of the [gas] to expitaxially deposit a first layer on substrate 4, without thermally driven pyrolytic deposition ..." (see Schachamayer et al., column 1, lines 64, to column 2, line 2).

The laser of Schachameyer et al. is for a photo-CVD method and is used to decompose a gas. On the other hand, the laser of the present invention is for annealing a formed film, which is completely different in purpose and function from the laser of Schachameyer et al.

Applicants respectfully submit that Schachameyer et al. nowhere teaches or suggests forming any pre-film prior to any crystallizing irradiation step nor does Schachameyer et al. anywhere provide any way to form a pre-film on a substrate prior to any crystallizing irradiation step.

Applicants further respectfully submit that one of skill in the art would not have been motivated to modify the pre-form forming method taught by Zhang et al. with the Schachameyer et al. no-pre-film forming single chamber. Additionally (and alternatively), Applicants respectfully submit that one of skill in the art would not have been motivated to modify the Schachameyer et al. no-pre-film forming single chamber with the pre-firm forming method taught by Zhang et al.

Furthermore, Applicants respectfully submit that it would destroy the Schachameyer et al. principle of operation to not use an excimer laser to modify a gas to deposit a layer on a substrate, but to instead deposit a layer on a substrate and then to subsequently use a laser to crystallize the deposited pre-film. Similarly, Applicants respectfully submit that it would destroy the Zhang et al. principle of operation to not deposit a layer on a substrate and then subsequently use a laser to crystallize the deposited pre-film, but to instead use an excimer laser to modify a gas to deposit a layer on a substrate.

As none of Fan et al., Asakawa et al., Selvakumar et al., Ichikawa et al. and/or Krimmel make up for the above-discussed deficiencies in Schachamyer et al. and Zhang et al., Applicants respectfully submit that the presently claimed invention would not have been obvious any combinations of the applied references. Reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are thus respectfully requested.

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is

desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 01-2300, referencing **Attorney Docket No. 107351-00011**.

Respectfully submitted,

A handwritten signature in black ink, reading "Robert K. Carpenter". The signature is written in a cursive, flowing style. The first name "Robert" is written with a large, prominent "R". The last name "Carpenter" is written with a large, prominent "C". The signature is written above a horizontal line.

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